



Supplementary Figure: Forcing estimate for each of the three emission driven scenarios, RCP8.5 (top), SRES A1B (middle) and RCP2.6 (bottom). The forcings were diagnosed using estimates of the climate sensitivity parameter estimated from 1% CO_2 increase experiments using the original 17 Atmospheric Physics ensemble (Collins et al, 2011) which was coupled to the other 3 earth system components in this study. Using this estimate and the diagnosed Top of Atmosphere (TOA) radiative flux and surface temperature change, the radiative forcings were estimated for each of the 57 configurations and each scenario, using the following formula: Forcing = λ * temperature change + TOA change. As illustrated in Lambert et al, 2011 there are non-linearities arising from interactions between atmospheric feedbacks and other components that would not be captured in the method listed above. Nevertheless, these values can be taken as indicative of the radiative forcing within these simulations. For the two RCP emission scenarios, the equivalent radiative forcing value (8.5 and 2.6 W m^{-2}) for the RCP concentration driven scenario is indicated for 2100 (red). These lie towards the lower bound of the distribution of forcing estimates, which is not surprising given that the Bern-CC relationship (which is used to base the RCP emission to concentration relationships for consistency with previous SRES scenarios, Meinshausen et al, 2011b) lies towards the lower end of the range of relationships explored within the ensembles presented here.